

U.S. Application No. 10/606,924, filed June 26, 2003
Attorney Docket No. 16100US02
Amendment dated November 26, 2007
In Response to Office Action mailed July 26, 2007

Amendments to the Claims

This listing of claims will replace all prior versions and listings of claims in the application:

Claims 1-17 (Cancelled).

18. (Currently Amended) An apparatus ~~for transmitting that transmits~~ a signal comprising:

Quadrature Phase Shift Keying (QPSK)

a QPSK mapper configured to receive input data;

Multiple Trellis Coded Modulation (MTCM)

a first MTCM encoder and QPSK mapper unit coupled to the QPSK mapper;

a first symbol selector and puncturer coupled to the first MTCM encoder and QPSK mapper unit, wherein the first symbol selector and puncturer is configured to provide a first channel-coded symbol stream;

a symbol interleaver coupled to the QPSK mapper;

a second MTCM encoder and QPSK mapper unit coupled to the symbol interleaver;

a symbol de-interleaver arrangement coupled to the second MTCM encoder and QPSK mapper unit;

a second symbol selector and puncturer coupled to the symbol de-interleaver arrangement, wherein the second symbol selector and puncturer is configured to provide a second channel-coded symbol stream;

an inner encoder coupled to the first and second symbol selector and puncturers, wherein the inner encoder is configured to receive the first and second channel-coded symbol streams and provide space-time coding to the first and second channel-coded symbol streams, thereby generating a first and a second space-time-channel-coded symbol streams; and

a plurality of antennas coupled to the inner encoder, wherein two of the plurality of antennas are each configured to transmit one of the first and second space-time-channel-coded symbol streams.

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19. (New) The apparatus according to claim ~~18~~¹, wherein the apparatus that transmits the signal is part of a wireless transceiver in a wireless mobile communications device, and wherein the wireless mobile communications device supports orthogonal frequency division multiplexing.

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~~20.~~ (New) The apparatus according to claim ~~18~~¹, wherein the apparatus that transmits the signal is part of a wireless transceiver in a wireless mobile communications device, and wherein the wireless mobile communications device supports code division multiple access.

⁴
~~21.~~ (New) The apparatus according to claim ~~18~~¹, wherein the apparatus that transmits the signal is part of a wireless transceiver in a wireless mobile communications device, and wherein the wireless mobile communications device supports spread spectrum modulation.

⁵
~~22.~~ (New) The apparatus according to claim ~~18~~⁴~~21~~¹, ~~wherein the apparatus that transmits the signal is part of a wireless transceiver in a wireless mobile communications device, and wherein the wireless mobile communications device supports orthogonal frequency division multiplexing.~~

⁶
~~23.~~ (New) The apparatus according to claim ~~18~~¹, wherein the apparatus that transmits the signal is part of a wireless transceiver in a wireless mobile communications device, and wherein the wireless mobile communications device supports voice communications and multimedia communications.

⁷
~~24.~~ (New) The apparatus according to claim ~~23~~⁶, wherein the wireless mobile communications device supports navigational communications.

⁸
~~25.~~ (New) The apparatus according to claim ~~18~~¹, wherein the apparatus that transmits the signal is part of a wireless transceiver in a Universal Mobile Telecommunications System mobile communications device.

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~~26.~~ (New) The apparatus according to claim ~~18~~; wherein the symbol de-interleaver arrangement comprises a plurality of symbol de-interleavers.

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~~27.~~ (New) A spread spectrum cellular phone having a plurality of antennas, comprising:
a ~~Quadrature Phase Shift Keying (QPSK)~~ QPSK mapper configured to receive input data;
a ~~Multiple Trellis Coded Modulation (MTCM)~~ MTCM encoder and QPSK mapper unit operatively coupled to the QPSK mapper;
a first symbol selector and puncturer operatively coupled to the first MTCM encoder and QPSK mapper unit, the first symbol selector and puncturer being configured to provide a first channel-coded symbol stream;
a symbol interleaver operatively coupled to the QPSK mapper;
a second MTCM encoder and QPSK mapper unit operatively coupled to the symbol interleaver;
a symbol de-interleaver arrangement operatively coupled to the second MTCM encoder and QPSK mapper unit;
a second symbol selector and puncturer operatively coupled to the symbol de-interleaver arrangement, the second symbol selector and puncturer being configured to provide a second channel-coded symbol stream; and
an encoder operatively coupled to the first symbol selector and puncturer and to the second symbol selector and puncturer, the encoder being configured to receive the first channel-coded symbol stream and the second channel-coded symbol stream, the encoder providing space-time coding to the first channel-coded symbol stream and to the second channel-coded symbol stream, the encoder generating a first space-time-channel-coded symbol stream and a second space-time-channel-coded symbol stream.

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~~28.~~ (New) The spread spectrum cellular phone according to claim ~~27~~, wherein the plurality of antennas are operatively coupled to the encoder. 10

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¹²
~~29~~ (New) The spread spectrum cellular phone according to claim ~~28~~, wherein two of the plurality of antennas are each configured to transmit one of the first space-time-channel-coded symbol stream and the second space-time-channel-coded symbol stream. ¹¹

¹³
~~30~~ (New) The spread spectrum cellular phone according to claim ~~27~~, wherein the QPSK mapper, the first MTCM encoder and QPSK mapper unit, the first symbol selector and puncturer, the symbol interleaver, the second MTCM encoder and QPSK mapper unit, the symbol de-interleaver arrangement, the second symbol selector and puncturer and the encoder are part of one or more wireless transmitters. ¹⁰

¹⁴
~~31~~ (New) The spread spectrum cellular phone according to claim ~~27~~, wherein the spread spectrum cellular phone supports code division multiple access. ¹⁰

¹⁵
~~32~~ (New) The spread spectrum cellular phone according to claim ~~27~~, wherein the spread spectrum cellular phone supports orthogonal frequency division multiplexing. ¹⁰

¹⁶
~~33~~ (New) The spread spectrum cellular phone according to claim ~~27~~, wherein the spread spectrum cellular phone supports voice communications and multimedia communications. ¹⁰

¹⁷
~~34~~ (New) The spread spectrum cellular phone according to claim ~~27~~, wherein the spread spectrum cellular phone supports navigational communications. ¹⁰

¹⁸
~~35~~ (New) The spread spectrum cellular phone according to claim ~~27~~, wherein the spread spectrum cellular phone comprises a Universal Mobile Telecommunications System phone. ¹⁰

¹⁹
~~36~~ (New) A cellular phone having a plurality of antennas, comprising:
^{Quadrature Phase Shift Keying (QPSK)}
a QPSK mapper configured to receive input data;
^{Multiple Trellis Coded Modulation (MTCM)}
a first MTCM encoder and QPSK mapper unit operatively coupled to the QPSK mapper; ¹⁰

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a first symbol selector and puncturer operatively coupled to the first MTCM encoder and QPSK mapper unit, the first symbol selector and puncturer being configured to provide a first channel-coded symbol stream;

a symbol interleaver operatively coupled to the QPSK mapper;

a second MTCM encoder and QPSK mapper unit operatively coupled to the symbol interleaver;

a symbol de-interleaver arrangement operatively coupled to the second MTCM encoder and QPSK mapper unit;

a second symbol selector and puncturer operatively coupled to the symbol de-interleaver arrangement, the second symbol selector and puncturer being configured to provide a second channel-coded symbol stream; and

an encoder operatively coupled to the first symbol selector and puncturer and to the second symbol selector and puncturer, the encoder being configured to receive the first channel-coded symbol stream and the second channel-coded symbol stream, the encoder providing space-time coding to the first channel-coded symbol stream and to the second channel-coded symbol stream, the encoder generating a first space-time-channel-coded symbol stream and a second space-time-channel-coded symbol stream.

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~~37~~ (New) The cellular phone according to claim ~~36~~, wherein the cellular phone supports code division multiple access, voice communications, multimedia communications and navigational communications.